

INNOVATIONS IN HOLLOW-BODY PRINTING

Hybrid printing is becoming ever popular in the surface-printing industry, as Holger Tiemann of Koenig & Bauer Kammann reports



Holger Tiemann is Area Sales Manager at Koenig & Bauer Kammann GmbH

Hybrid printing combines screen and digital, as well as screen and hot stamping. There is an increased demand for customised decoration of shaped products made of glass, plastic, metal and other substrates which hybrid machines can achieve. Hybrid application is characterised by absolute flexibility and can save an enormous amount of time, effort and cost.

CERAMIC INKS

In classic ceramic glass screen printing, the solid ink in the screen is heated and becomes liquid. The curing of the printed image occurs in an oven at approximately 600°C. Ceramic ink is characterised by very good scratch and adhesion resistance. Thanks to further developments, these inks can also be fed to the screen by ink pumps. This makes it possible to design machines with extremely high printing speeds.

Printing speeds with an output of up to 300 products per minute are common, as proved by machines such as the HS300 from Koenig & Bauer Kammann. The classic use of ceramic ink is tableware-glass printing and bottle printing. Due to the high scratch and adhesion resistance, the bottles printed with ceramic ink can be filled in a fast-running line.

“Digital-relief printing offers a huge cost advantage over conventional processes, short turnaround times and a good carbon footprint”

SOLVENT-BASE INKS

Solvent-based inks are popular for children's products, such as toys and bottles, due to evaporation of the solvent which makes the inks food-safe. These inks are also used for paper finishing, thermoplastics, glass and metal. Solvent-based inks are cured by hot air, removing or tempering the solvent. The disadvantage of solvent-based screen printing is the relatively long drying time and restrictions in the printed images. The processing time of the ink also limits the image-print possibilities. During the printing process, care must be taken to keep the screen open.

UV-SCREEN PRINTING

The modern UV-screen printing with organic inks is finding more and more applications.

Originally developed for plastic articles, it has become increasingly popular in glass finishing. There are several advantages of UV-screen printing, including short drying times, high production speed, good resistance and a high gloss. Half-tone printing and fine lines are easily achieved thanks to long screen open time. The latest UV-LED dryers reduce energy consumption and associated



Digital print: white + ymck + top coat

Sample gin bottle, digital reverse print (inside/outside): 2 x ymck + 1 x white + top coat



Sample tailored bottle, digital print + digital relief print: white + ymck + top coat + digital relief print



Sample whisky bottle, special feature: banderole in glass optics, digital print + digital-relief print, white + ymck + top coat + digital-relief print





The K15 CNC screen-printing, digital-printing and hybrid-printing machine, up to 24 stations, and with speeds up to 110 cycles/minute, for glass or plastic

CO₂ emissions. Compared to ceramic ink, UV-screen printing is becoming more and more important. Adhesion and scratch resistance on glass have also increased enormously in UV-screen printing thanks to further development of inks and pre-treatment systems.

HOT STAMPING

When comparing direct-printing processes, hot stamping should be included. In this process, embossing foils, embossing stamps, pressure and heat come together. In the case of plastic items, the print image is transferred from the embossing foil by a heated embossing stamp or wheel. The embossing tool, upon which the image is engraved, is pressed onto the product and, with heat and pressure, the image is transferred or embossed. The foil,

usually metallic in various colours – gold and silver being the most popular – is coated with a primer to ensure good adhesion.

For glass products, a primer of the decor design is printed in advance. By embossing glass, in comparison to plastic, the embossing tool is not image engraved. The release of the

“Colour-management software ensures consistent quality, even with different file types”

embossing image from the foil is achieved with a previously-printed primer. Where the primer remains, the foil adheres. Hot stamping is one of the most impressive ways of decorating glass or plastic. These products are mainly used in the finishing of glass flacons, plastic items in the cosmetic industry and wine bottles.

DIGITAL PRINTING

Digital printing offers a unique print quality with resolutions of 360–1200dpi, depending on the product's geometry and tolerances. With special technical features, printing can be done in areas where conventional printing processes are limited. In combination

with dynamically moveable, product-holding devices, even complex geometric shapes can be decorated. Beer glasses and drinking bottles, for example, can be printed over their full height.

Digital printing makes personalisations, special series or single prints possible as well as online-based jobs controlled directly

Continued over



The HS-300, a high-speed screen-printing machine for glass bottles, with up to eight colours, up to 300 cycles/min with ceramic ink for body and neck printwith

from website to press. Colour-management software ensures consistent quality, even with different file types. With special features in the machines, such as an article scanner with corresponding software, the printing of

“Flexible and versatile machines, such as the K15, allow a combination of decoration processes”

conical and waisted articles can be optimised. A perfect 360° banderol print is also possible with non-circular articles and is individually different for each printing station. The K15 and K20 machine series from Koenig & Bauer Kammann, standardise these types of solutions.

DIGITAL-RELIEF PRINTING

With the latest digital-printing technology, the digital-relief printing's unique and personalised designs can be offered to the customer. These can be produced either transparently or with colour. Digital-relief printing offers a huge cost advantage over conventional processes, short turnaround times and a good carbon footprint. Not least due to the energy-saving, most recent UV-LED drying.

Digital relief printing can be printed up to a 3mm thickness and is especially suitable for printing small fine details or thicker reliefs. Digital-relief printing is precise and sharp-edged down to 0.01mm. Depending on print length and print height, up to 60 cycles/min can be achieved in digital-relief printing on the K15. Excellent adhesion resistance and more than 1,000 dishwasher cycles are standard. To ensure this, an optimal pre-treatment is necessary.

The most complex artworks are achievable with the combination of screen, digital, hot stamping and digital-relief printing. Hybrid-printing machines can make these combinations a reality, due to their absolute flexibility. Whether a combination of screen printing and digital printing, screen printing and hot foil stamping or screen printing and labelling, a variety of options are now possible. Hybrid printing can offer the customer the option of carrying out several finishing steps in one. The extremely precise register tolerance, while combining different types of finishing in one machine system, is hardly possible with conventional, decentralised systems. As the product remains in the article holder during the process, screen and digital printing can be ideally paired. With large machine systems, such as the K15XL, all three types of finishes can be combined. Hybrid application saves an enormous amount of time, effort and cost. These new technologies and developments are already being used by Koenig & Bauer Kammann customers.

A MACHINE FOR EVERY CUSTOMER

Carbon Decor is a French specialist in glass printing for the perfumery, cosmetics and bottle industries and is proud to offer consistently high-quality services thanks to digital and automated machines. Flexible and versatile machines, such as the K15, allow a combination of decoration processes. Personalised relief, pure screen, digital, digitally-printed relief and hot stamping are all within their remit. Whether 'normal', high-speed or two-up, these machines produce consistent results.

Popular hybrid machines combine screen and digital printing as well as screen printing, hot stamping and an increase in digital-

printed relief. Variable article holders in all stations, bottom register camera, article scanner, image inspection are a matter of course. Another example is the HS300 which is a screen-printing machine for glass bottles that reaches up to 300 cycles/min. To be able to run at these speeds without interruption, the ceramic ink is fed to the screen by heated ink pumps.

“Hybrid application saves an enormous amount of time, effort and costs”

For smaller production runs, printers such as the K20, can be used with one or two article fixtures. This means that tooling costs are low and set-up times are short. For the pre-treatment of glass articles for UV-screen printing, the K31 series optimises results.

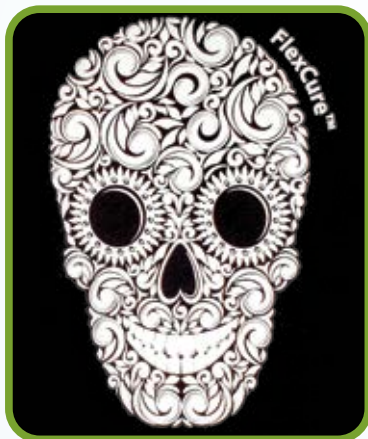
CONCLUSION

Traditional screen printing continues to develop, while inline hot stamping and digital printing are becoming more popular. Thanks to modern, hybrid technology, the combined advantages offer the customer ideal finishing options. The printing industry can look forward to seeing what else Koenig & Bauer Kammann will bring to the market in the future. ■

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